

accommodate participants who were at those organizations for other, regularly scheduled activities. AFB staff administered these sessions with the assistance of staff and volunteers from the agency where they took place.

Each viewing session began with a brief introduction to explain what would be happening and set the session in the context of the larger study. All groups saw the program "Orphans of Time" from *The New Explorers* series first. After seeing the program, each participant responded individually to the set of questions dealing with the program content and his/her response to it. Each participant chose whether to respond in regular print, large print, braille, or by having someone read the questions and record the answers; each person was allowed as much time as necessary to answer the questions. The participants had a break with refreshments before seeing the first half hour of "Wild Dogs of Africa" from the *Nature* series and answering questions based on this half of the program. At the end of the session, the participants were thanked for coming, reminded about the follow-up interview, and asked not to talk with other blind people about the content of the programs or questions

The experimental variation was that half the viewing sessions showed "Orphans of Time" with description and "Wild Dogs of Africa" without description. The other half showed "Orphans of Time" without description and "Wild Dogs of Africa" with description. Everyone was given the same questions whether s/he had seen the described or the undescribed version of the program. Thus, each person served as an experimental participant for the program s/he saw with description and control for the program s/he saw without description.

In order to test whether adding the verbal description of visual material conveyed more information than seeing the program without the additional descriptions, we included questions based on the audio description. However, we were concerned that some participants would feel less adequate because they did not know factual information shown in the program. To minimize such impacts, we talked about these issues in the focus groups and with the participants in the pre-test sessions; they did not report any discomfort. We also took two additional measures. First, before showing each program, and again before administering the questions, we emphasized that we were testing how well the programs worked and not how knowledgeable the participants were. Second, we included "I don't know" as one of the answers to each factual question and said explicitly that it was as useful an answer as any other since we were trying to find out how effective the programs are

Our initial plan was to run two sessions simultaneously so that all those who attended at any particular time could be assigned randomly to the two treatments. This proved not feasible because of scheduling difficulties. Therefore, when we could not run two sessions simultaneously, we alternated treatments. Because some people did not attend the session for which they were scheduled, fewer people saw "Orphans of Time" with description (n=53) than saw "Wild Dogs of Africa" with description (n=58).

DIFFERENCES BETWEEN THE TWO SERIES

The purpose of this study was to examine the impact of description of TV science programs on blind viewers. To evaluate the impact of description incorporated into the two series, *The New Explorers* and *Nature*, we selected one program from each series. "Orphans of Time," from the series *The New Explorers*, is a fast-paced show in which the program narrator talks with the scientists featured in the program and the scientists talk with each other. While it does offer limited opportunities for description to be added, these are generally quite brief. In contrast, "Wild Dogs of Africa," from the series *Nature*, has one narrator and no other human voices. It contains longer segments in which information is conveyed by visual images without any verbal clues for people who cannot see what is happening.

Below we discuss the implications of these differences in two ways. First, we discuss how we took account of these differences in designing the study. Then we present two scenes from each program to discuss some of the ways description makes information available to viewers who cannot see the visual presentations.

Implications for the Experimental Design

We knew from the outset that the programs we selected had different styles. Since "Orphans of Time" already had much more program narration, we anticipated that the added description would make more difference in participants' responses to "Wild Dogs of Africa" than to "Orphans of Time." Independent of these differences between the two programs, we also anticipated that the presence or absence of description would be more salient for people who saw a described program followed by a program without description than for those who saw the programs in the opposite order.

Ideally, we would have divided the participants into four groups so that we could vary independently which program was shown first and whether or not the program was described; we opted not to do so because of the limited number of participants in the study. It was not feasible to use each participant as his or her own control--i.e., to have each participant see each program with and without description. Since the consumer focus group advised against having half the participants see only undescribed programs, we elected to have each participant serve as an experimental subject for one program and a control subject for the other. On the basis of all these factors, we chose to show everyone "Orphans of Time" first followed by "Wild Dogs of Africa" and to vary whether they saw the first or the second program described. This means, however, that we cannot entirely separate the order effects from the treatment effects: all those people who saw a described program followed by an undescribed program were the ones who saw "Orphans of Time" with description and "Wild Dogs of Africa" without description.

Information Available in the Descriptions

In both of these series, the narrative and visual portions are well-integrated, each conveying much information. Because television is designed for a sighted audience, visually

striking scenes and obvious visual details often are shown with no comment. Audio description is designed to provide visually impaired viewers with access to key actions and details that are being presented visually. Since it is important that the description not interfere with the narration, each descriptive passage must be fitted into the available pauses in the program narration. The two programs used in this evaluation offer quite different opportunities and challenges because of their contrasting styles. To illustrate how each program uses description, two scenes from each program are transcribed below. In each, the words are spoken by the program narrator, except for the described portion, which is indented and printed in italics. Information that is not spoken--the names of speakers other than the narrator or sounds--is capitalized and enclosed in square brackets.

In the first scene from "Orphans of Time" transcribed below, the expedition approaches and begins exploring the Greek caves where the scientists hope to find seals:

[NARRATION] Our destination is in sight. The outer islands of the northern Sparantus, maybe the last refuge for monk seals in the Aegean. Twenty years ago, there were 50 to 60 monk seals in these waters. Now maybe 25. Thanks to Vasilus Corata's hard work, this area is a national marine park. We'll drop anchor and paddle to the caves in a dinghy.

[VASILUS] "I would like to ask you that we are coming with us now, to this visit, that you have to keep quiet as much as possible, not even, uh, say a name or not even when you see a seal and you feel, you know, excited; don't turn to me and say, 'Oh, there's a seal there!' I know that it will be a seal there, but I want you to keep quiet and just use your hands to wave to me. Nothing else. Otherwise, we shall disturb the animal and of course the animal will leave. And we don't want to disturb the animals."

[DESCRIPTION] Vasilus, Lees, and another man climb into the inflated dinghy.

[D] Later, as the sun sparkles on the water, they paddle toward a rocky cliff, lined with caves and crevices.

[N] It's rare to see monk seals. There are so few to see, but any evidence of them will make this trip a success. The team will look for seal tracks or even their scent. These will tell them that seals have been using the caves.

[D] The dinghy approaches a cave with only a foot of clearance above the water's surface.

[D] The pale green, crystal-clear water ebbs and flows past the entrance. The other researcher stops the raft from bumping into the rough, gnarled cliff.

[D] Vasilus climbs out and crouches in the ankle-deep water. Peering into the cave, he shines a flashlight into the dark recesses and ledges along the pitted back wall.

[D] He climbs back into the boat, picks up an aluminum oar, and paddles the team away.

[N] Nothing. No seals.

[D] Later, shaded from the late afternoon sun, the team of three scientists paddles toward an enormous cavern at the foot of the cliff. A pointed island of rock as large as a house sits in the water behind them.

[D] They beach the dinghy and enter the rock-strewn cavern. Vasilus' teammate straps a device to one of the rock walls.

[N] Vasilus' team uses different methods to determine the concentration of monk seals. One is direct observation, what you can see with your own eyes. Another uses cameras, like this one. It automatically takes pictures of any new animals and documents seal behavior.

[VASILUS] "You can see the, the head, body."

[N] Seals have been here recently. The shapes of their bodies are in the sand. Seal tracks. And you can smell them.

[D] Vasilus sniffs the seal's imprint.

[LEES] "You think that's a small one?"

[VASILUS] "It looks like a small animal, yeah."

[N] But for now, no seals. The search continues.¹

This scene, which contains more DVS description than any other in the program, illustrates the way that the additional description provides information about visual details such as the appearance of the water and rocks. In addition, actions that are apparent for the sighted viewer, in this case the scientists' activities, are made clear for those who cannot see the action

¹ Program narration from the preceding excerpts is taken from "Orphans of Time" from the PBS series *The New Explorers*. *The New Explorers* is a production of Kurtis Productions and WWTW, Chicago. Description on this program, printed here in italics, is provided by Descriptive Video Service at WGBH/Boston.

taking place.

After a scene with different scientists in Hawaii, the next scene picks up the story at the Greek caves. This scene, which climaxes the portion of the program in Greece, follows the scientists as they finally find seals:

[D] Now, in the rubber dinghy.

[N] But in Greece, Lees and Vasilus have visited six caves and have not seen a monk seal yet.

[D] They paddle into a narrow rock corridor.

[N] But this one seems different. Far to the back, there are black forms. Shapes that could be - yes, there one moves. It is a seal

[D] A seal with a dark hide rests on a gravelly ledge.

[N] And others to the left. And pups underneath.

[D] A camera light illuminates the cave. The seals look up.

[N] They must be very quiet, not wanting to disturb. But inside, Vasilus must be bursting.

[D] Two seals scurry into the water; two others shield their young.

[N] Another pup and beyond.

[D] A small, plump seal pup lies a few feet to the right. Its eyes shift between an adult and us; then the adult scoots into the water.

[N] For Lees to come all this way and be able to see this.

[D] Another small furry pup fumbles over the loose gravel toward its mother. A pup at the mother's bosom pokes up its head.

[D] Later, outside, Vasilus grins as he paddles away

[VASILUS] "That was incredible. It's the first time in my whole life that, I'm working with seals and 12 years now, that I saw that scene. It was incredible - four adult

animals, one about 2½ months - pup. One 10 days, 10-days pup. And another just newborn, not more than 24 hours, 48 hours "²

[LEES]

This scene is more typical of the pace of "Orphans of Time" as a whole in that it permits only limited opportunities to add description. Yet even brief DVS descriptions can be important because audience members who cannot see well or at all may miss graphic details, nuances, and crucial actions that are portrayed visually. For example, the phrase at the beginning of the description--"Now in a rubber dinghy"--helps orient the viewer to the fact that the scene has changed. The descriptions of the seals' actions add crucial details that otherwise would be inaccessible to a person who could not see.

The scenes in "Wild Dogs of Africa" provide much more opportunity for description. The brief scene below begins by marking a transition from the theme of the previous scene and ends with a transition back to the previous theme:

[D] As Alpha enters what used to be Beta's den, we glimpse Beta's face. Later, the bereft mother joins Snow White and four other reclining dogs.

[RUMBLING THUNDER]

[D] Now, in a grayish-blue sky, thick clouds gather to block the sun.

[N] Wild dogs have their litters during the rainy season when millions of wildebeests flood onto the Serengeti

[D] We look across the flat, muted-green savannah, toward a steel-blue horizon. In the foreground, thirty to forty wildebeests stroll across our view. The spindly-legged, buffalo-like animals have wide shoulders and bovine faces

[D] Several dogs lie close together in the grass, rain dripping from their long noses.

[HONKING WILDEBEESTS]

² Program narration from the preceding excerpts is taken from "Orphans of Time" from the PBS series *The New Explorers*. *The New Explorers* is a production of Kurtis Productions and WWTW, Chicago. Description on this program, printed here in italics, is provided by Descriptive Video Service at WGBH/Boston

[D] Driving rain darkens the charcoal-grey and brown hides of the wildebeests. As our view pulls back, the grass is a richer green. Scattered wildebeests fill the plain as far as the eye can see

[MUSIC CHANGES]

[D] Later, the sun spreads a glow across a hill, and two perky-eared dogs poke up from a sunken den. Snow White stretches her legs among the wild flowers.

[4 CAWS]

[D] Beta lies in the grass, glancing back over her shoulder.

[N] Snow White continues to try to cheer up Beta.³

In the preceding scene, as in the one that follows, the striking pictures convey sufficient information to sighted viewers. A person who cannot see would still hear the sound of thunder; thus the narrator's comment about the wild dogs having their litters in the rainy season would make sense. But the program narration provides no clues about the landscape or the wildebeests' appearance

The scene that follows also presents a good example of information portrayed visually that needs no additional narration for the sighted viewer, but is relatively inaccessible to a person who cannot see the actions. As in the previous examples, the first and last parts of the DVS description provide the transitions from and to adjacent scenes. The words of the description -- "Now, Alpha..." and "Elsewhere, Beta..." -- as well as the way they are delivered, mark that these are transitions.

[D] Eager puppies file into the den beneath the overhang of Alpha's belly. The hyena walks slowly away across the savannah, passing four wildebeests at rest on the grass

[D] Now, Alpha emerges from her den, holding a puppy in her mouth by the rump.

[N] The den has started to smell, an attraction to predators. So Alpha has decided to move the puppies. But they're heavy and she has trouble getting a firm grip.

³ Program narration from the preceding excerpts is taken from "Wild Dogs of Africa" from the PBS series *Nature*. This program is a production of Thirteen/WNET in association with Partridge Films, Limited. Description on this program, printed here in italics, is provided by Descriptive Video Service at WGBH/Boston.

[D] A wildebeest grazes nearby as Alpha runs across the hill. She stops abruptly as the puppy falls out of her mouth.

[N] Beta watches the transfer intently

[D] Nodding and bowing her head, Beta moves closer. Alpha picks up the puppy by one arm.

[N] Despite Alpha's rank and experience, she's not very skillful at carrying pups.

[D] In a grassy area scarred with nearly-hidden gouges, Alpha trots to a deep hole, and out of sight. Another dog sits unmoving in another den a few yards away.

[FAINT BACKGROUND NOISES]

[D] We glimpse a half dozen zebras standing in a group.

[N] The pups freeze instinctively no matter where she grabs them.

[D] Our view returns to Alpha, who runs with another pup held by the arm in her gentle, but firm grip. She runs past the zebras, the pup's tiny hind legs bouncing up and down.

[N] This pup gets a very rough ride.

[D] One zebra grows aggressive, chasing Alpha off her path and into a sudden, wide circle.

[N] Miraculously, no harm's done

[D] Pausing to scan the horizon, Alpha continues on her way.

[HOOFBEATS]

[D] Two horselike, black and white striped zebras chase each other into their herd.

[N] She holds each pup firmly, but delicately

[D] Holding a pup with its head pointing toward the ground, Alpha hustles past us. Another aggressive zebra runs by, lowering its head. Alpha

reaches the den without incident, and carefully deposits the puppy. A male dog stands guard at the edge of the den, his tail flicking from side to side.

[D] Elsewhere, Beta gazes straight ahead

[N] Beta decides to help, but she has learned even less about moving pups.⁴

In this scene, the program narration makes clear that the mother dog is moving the puppies from the old den to a new one in order to avoid attracting predators. However, the entire interaction between the mother dog and the zebras is presented visually and by the sounds of the zebra's hooves. Because the action is so dramatic, the program narrator does not mention it. The audio description fills in these details.

MINIMIZING BIAS

Controlling potential sources of bias is always a concern in research. We attempted to make this evaluation of the impacts of description on blind viewers as impartial as possible. We were concerned that if participants thought they knew what we were trying to show, they might respond, deliberately or inadvertently, in ways that confirm their expectations. In particular, we were concerned that if participants thought that Descriptive Video Service® (DVS) at WGBH was conducting the research, and that it was trying to show that description enhanced television viewing, this might affect their responses. We took several measures to minimize consequences from this potential bias.

First, we did not tell participants that the purpose was to evaluate the impacts of description. From the beginning, they were told that the study would involve watching television programs on science topics. The viewing session was explained in terms of examining how well these existing programs worked for blind viewers; no mention was made of adding description. If participants asked about description, we deflected the question, for example, by saying that it was important for the study that we not discuss the details until they completed the study; then we would answer all their questions. At the end of the last interview, participants were told that a report summarizing the research would be sent as soon as it was completed. If participants had any questions, then the interviewers answered them. If the interviewers could not answer any question, they invited the person to call the project director to get more information. While a number of participants indicated considerable interest in receiving the summary report, none called for additional information about the study.

⁴ Program narration from the preceding excerpts is taken from "Wild Dogs of Africa" from the PBS series *Nature*. This program is a production of Thirteen/WNET in association with Partridge Films, Limited. Description on this program, printed here in italics, is provided by Descriptive Video Service at WGBH/Boston.

Second, all the study questions dealing explicitly with description were introduced only in the post-test--after participants had seen both the described and non-described programs and answered all the questions about the specific programs.

Finally, the American Foundation for the Blind (AFB) took the lead in contacts related to the evaluation. The initial letter was sent out on AFB letterhead; interested people were invited to send the return postcard addressed to AFB, to call the AFB 800 number, or to call a local number identified as WGBH not DVS. In addition, we made clear that AFB was responsible for carrying out the evaluation, e.g., interviewers introduced themselves by saying that they were calling on behalf of AFB. To minimize awareness of DVS' involvement in the research, we referred at all times to WGBH and the WGBH Educational Foundation, rather than DVS. For example, the experimental sessions were held in conference rooms at WGBH's two main buildings at 125 and 114 Western Avenue. The DVS department is located two blocks away at 144 Western Avenue. No study participants came to the DVS offices and the 30 participants who attended viewing sessions at cooperating organizations did not go to WGBH.

STUDY STRENGTHS AND LIMITATIONS

Sample Characteristics and Continuity

The size of the study sample, the continuity of participation through the study phases, and the diversity of the sample are important strengths. This study employed a substantial sample with high continuity: all 111 people who attended the viewing sessions also completed the final telephone interview. In addition, as intended, the sample is quite diverse with regard to their degree of vision loss, demographic characteristics such as age and education, and their prior exposure to described television programs

That the participants in this research are not a random sample of the population who are blind or severely visually impaired is both a strength and a limitation. Because it is not a random sample, generalizations to any larger population are more difficult to make. As indicated in the section on background characteristics below, we know that the participants' characteristics do not match those of the population of blind individuals. On the other hand, in contrast to those who would have been included through a strictly random sampling procedure, this sample includes far more people in strategically important subgroups, such as those who are totally blind or who have been blind since birth

It is also important to note that all the participants volunteered to take part. Some were recruited individually when they responded to an invitation in a letter or to an announcement on a telephone tape, on-line, or the radio. Others were recruited to take part while they were attending other regularly-scheduled activities at the cooperating organizations. Whichever way the person was contacted initially, each participated only after expressing an interest in doing so. This degree of self-selection may have introduced a bias into the sample

Research Design

The evaluation has relied on extensive interview data. While it would have been desirable also to use some behavioral measures, it would have been well beyond the scope of this evaluation, for example, to observe how many hours of described programs people watch or whether they seek out described programs. However, one major strength is that the design did include an experimental variation in order to collect the measures of cognitive impact of description. Another strength is that we sought consumer suggestions and reactions during the planning stages, and modified our procedures in response to their recommendations.

In the viewing sessions, participants saw only one full program and the first half of the second. The data from the experimental portion of the study are influenced by the specific characteristics of the two programs, not only by the presence or absence of description. With merely two programs and a limited number of study participants, it was not possible to separate out statistically the influence of the characteristics of the programs

In addition, we would have liked to have looked at long-term impacts of adding description to science programs on television. However, it is clearly unrealistic to think that viewing two half-hours of television on one occasion would result in measurably increased interest in science-related activities, such as going to museums, taking up new hobbies, or attending classes.

Reducing Bias

Although we consistently identified the study sponsorship with the NSF, AFB, and WGBH, we do not know to what extent some participants identified it with DVS, and if so, the ways in which that influenced their responses. We did not examine whether participants associated DVS with the study. We know from incidental comments that some participants were disappointed when one of the programs did not contain audio description. In addition, we know that 43 people who participated in the study are on the DVS mailing list although we deliberately did not use the DVS mailing list as a way to recruit participants. Finally, although we made a concerted effort to identify the study with WGBH rather than DVS, we do not know whether the participants distinguished as sharply between the two

FINDINGS

The findings from this evaluation are summarized below. The first section describes the participants' background characteristics, the extent of their vision if any, and their television viewing habits. It concludes with a brief discussion of ways this sample compares with the blind and severely visually impaired population of the United States.

The second section begins with descriptions of the ways participants experience television

viewing and audio description in general, and how they responded to the two specific programs included in this study. The section continues with a discussion of the extent to which the participants are at ease socially with described and undescribed programs. It concludes with a brief discussion of the participants' stated preference for description.

The final section of the findings presents the cognitive impacts of audio description in terms of recall of factual information immediately after watching the program and in terms of retention several weeks later.

As each question is discussed in the text, the wording of the question is presented in the footnotes. The complete questionnaires as administered are included in Appendix C. The distribution of responses to substantive questions is presented in Appendix D. Some distributions do not equal 100 percent because of rounding.

BACKGROUND CHARACTERISTICS OF THE PARTICIPANTS: DEMOGRAPHICS, VISION, AND TELEVISION VIEWING

Demographics

A total of 111 legally blind people, comprised of 39 percent men and 61 percent women, participated in this study.⁵ Participants ranged in age from 20 to 89, well spread out across the decades: 9 percent in their 20's, 11 percent in their 30's, 29 percent in their 40's, 19 percent in their 50's, 15 percent in their 60's, 11 percent in their 70's, and 6 percent in their 80's.⁶

Vision

About two-fifths of the participants (39%) were legally blind since birth.⁷ Another 12 percent became blind before the age of 20. The others reported age at loss of sight as follows: 10-13 percent in their 20's, 30's, or 40's; 7 percent in their 50's; and 3-4 percent in their 60's, 70's, or 80's. Although all the study participants are legally blind, they vary in the extent to which they have usable vision: 36 percent reported that they have no usable vision, 45 percent

⁵ Questionnaire 1: Question 28 (henceforth 1:28)

Participant sex: Male Female

Note: This information was recorded by the interviewer

⁶ 1:5 How old are you now?

⁷ 1:10 Have you been legally blind since birth or from a later age?

that they have a little usable vision, and 18 percent that they have considerable usable vision.⁸ Among those who report that they have no usable vision now, about 68 percent report that they do have visual memories.⁹

Those who currently have usable vision report considerable variation in the extent to which they rely on it for different activities. With regard to reading, 41 percent of those with usable vision report they do not rely on their vision at all, 21 percent rely on it a little, 16 percent rely on it a moderate amount, and 22 percent rely on their vision a great deal.¹⁰ With regard to television, 26 report they do not rely on vision at all, 31 percent rely a little, 12 percent rely a moderate amount, and 30 percent rely on their vision a great deal.¹¹

In a different context, all the participants were asked about the amount of detail they could see with any visual aids they use.¹² Half (50%) reported they could see no details, 19 percent a few details, 12 percent most details, and 19 percent said that the level of details varies. Participants pointed to quite different reasons why the level of details varies. Some emphasized aspects of their eye condition: for instance,

I have to be close for details, so it depends on how close I sit.

Depending on the time I put drops in.

Some days I can see better.

Others answered in terms of characteristics of the television production, for example:

It depends upon the lighting of the TV show. If it's dark, I can't get much detail

⁸ 1:13 How would you describe your amount of usable vision - do you have none, a little, or considerable?

None (*go to 13a*)

A little or considerable (*go to 13b*)

⁹ 1:13a Do you have any memory of being able to see?

¹⁰ 1:13b How much would you say you rely on your vision for reading print - not at all, a little, a moderate amount, or a great deal?

¹¹ 1:13c How much would you say you rely on your vision for watching television - not at all, a little, a moderate amount, or a great deal?

¹² 4:13 When watching TV, what amount of detail can you see with any visual aids you use? Can you see no details, or a few details, or most details, or does the level of details you see vary?

If it's a close-up shot of someone's face, I can see their facial expressions. If it's a full-body shot, I miss the facial expressions.

High contrast is good. Shades of color are difficult.

I can see large forms and color.

Things that move quickly, small items, any writing on the screen, I can't see.

Education and Employment

Study participants differ in the level of education they have achieved.¹³ Most acquired at least a high school education, although 11 percent completed eleventh grade or less (of whom only two people reported less than an eighth grade education), 19 percent graduated from high school. Among the 68 percent who went to college, 42 percent received a bachelor's degree, of whom more than half (23% of the total group) obtained post-college education. Further, at least 11 percent are currently students seeking degrees, mostly at the bachelor's level.¹⁴

The major daily activities of those who took part in this evaluation vary. Slightly less than half the participants (43%) are employed currently.¹⁵ However, the overwhelming majority (91%) of those who are not working now did work for pay previously.¹⁶ The majority (58%) of the participants report that their major daily activity--whether paid employment or something else--is not at all related to science.¹⁷ However, 21 percent report that the activity is slightly related to science, 17 percent that it is closely related to science, and 5 percent that this activity is in a science field.

¹³ 1:15 What is the highest grade in school you have completed?

¹⁴ 1:15a Are you currently a student seeking a degree?

1:15b *(if yes)* What degree?

¹⁵ 1:16a Is your major activity paid employment?

1:17 *(or if paid employment is not the major activity)* Are you also employed?

¹⁶ 1:18 *(If not employed)* Have you previously worked for pay?

¹⁷ 1:16 We'd like to know a little about your major daily activity -- employment, volunteer work, studying, work in the home, or something else. Would you say your major activity is in a science field, closely related to science, slightly related to science, or not at all related to science?

Television Viewing

Turning specifically to television, study participants report varied television habits and preferences. A few participants (5%) do not usually watch any television.¹⁸ A considerably larger proportion, 28 percent, watch fewer than 10 hours per week. Another 30 percent watch 10-19 hours, 17 percent watch 20-29 hours, 9 percent watch 30-39 hours, and 12 percent watch 40 or more hours (including those who said that their TV is always on).

The vast majority (86%) watch at least some science programs. Only 3 percent of the participants describe themselves as very uninterested in science programs on television; 6 percent are somewhat uninterested, 55 percent somewhat interested, and 36 percent very interested in science programs on television.¹⁹

Although almost all the study participants watch some television in the course of a typical week, half (51%) of those who took part in this research report they do not watch any described television programs typically.²⁰ Among those who watch described programs, about two-thirds (33% of the whole sample) report they watch 2 hours or less per week while the other third watches 3-5 hours per week typically. Among all participants, 67 percent said that they seek out described programs, and 72 percent said they seek out described science programs.²¹ (Some others implied they would seek described programs if they could, for instance saying their TV doesn't have a SAP channel or that they don't know when described programs are broadcast.)

¹⁸ 1:19 In a typical week, about how many hours of television do you watch?

¹⁹ 1:25 Some people are very interested in TV shows on science topics; others are not interested at all. How would you describe yourself? Are you very interested in shows on science topics, somewhat interested in shows on science topics, somewhat uninterested in shows on science topics, or very uninterested in shows on science topics?

²⁰ 4:36 In a typical week, how much would you say you watch described programs on TV? Not at all, 2 hours or less, 3-5 hours, or more than 5 hours?

²¹ 4:37 Do you seek out programs if you know they will be described?

4:38 Do you seek out programs dealing with science topics if you know they will be described?

Finally, all participants were asked about the extent of their experience with audio description.²² The overwhelming majority (89%) said they had heard of it. Three-fifths reported that they had experienced audio description in addition to their exposure during this evaluation; 25 percent said they had not experienced it elsewhere; 14 percent were uncertain if they had experienced it elsewhere. Those who had been exposed to description previously were fairly evenly distributed: 40 percent had experienced audio description on television only, 31 percent in other settings such as museums, theater or home videos, and 28 percent in both kinds of settings. Although more than half of those who participated in this research did have other experiences with it, few said that their experience was extensive; the large majority, 78 percent, reported that they had experienced only a little audio description.

SAMPLE REPRESENTATION OF THE U.S. BLIND/VISUALLY IMPAIRED POPULATION

As expected because we recruited from blindness organizations, some of the sample's relevant social and disability characteristics differ from characteristics estimated to apply to the nation's entire population of legally blind adults. That difference is a consequence of factors affecting self-selection into the "blindness system." Notably, persons who affiliate with the type of organizations that constituted our sampling pool, as compared to the entire legally blind population, are more likely to:

- o be close to or at the totally blind end of the vision continuum;
- o have acquired their impairment at birth or prior to old age;
- o be younger, e.g. under 65 years of age.

²² 4:20 Have you heard of "described video" or "audio description" in which commentary is added to television programs to make them more accessible to people with visual impairments?

4:23 Other than the program on the monk seals or wild dogs, have you ever experienced this added description? Would you say, "yes," or "no," or "I don't know?"

(if yes)

4:23a Where have you experienced the added description: on television programs or in other settings (such as theater, home videos, or museums), both, or don't know?

4:23b How much description have you experienced: a little or a lot?

Related to these factors, persons affiliated with blindness organizations are more likely than those unaffiliated, to have completed more education and to be more involved with paid employment. This is particularly the case in the urban northeast.

Even though we did not apply representative sampling procedures to the organizational sources, and do not have specific data on the distribution of the just-reviewed characteristics in that pool, the resulting sample fits our general expectation of the legally blind population with such affiliations. A more definitive statement of how well our sample may represent a defined subgroup of the legally blind population must await the analyses of other research efforts currently underway.²³

What considerations result from this assessment of ways the sample characteristics relate to the larger blind population and specifically to those affiliated with blindness organizations? First, we believe that the characteristics that dominate in the sample more than in the larger population are precisely those that would describe the group most likely to be drawn to using audio description especially on science programming, that is: persons with less vision, longer time since onset, nonelderly, and more highly-educated.

Second, we were more concerned with achieving diversity on these characteristics in our sample, than with matching the distributions in the target audience. On that basis, the results are gratifying. Because the sample contains substantial numbers who do and do not have usable vision; who have had and have not had visual experience; who are highly educated and much less so; and who are currently quite young, middle-aged, or old -- we will be able to examine the influence of those variables on the effects of description that we have reviewed in this report. Those sub-group analyses are the prime tasks for further analyses of these data.

PSYCHOLOGICAL AND SOCIAL IMPACTS

Television Viewing

For many participants, watching television is a relatively solitary affair. Nearly two-thirds (62%) of the study participants live with other people.²⁴ Nevertheless, many watch television alone: only 3 percent of those in the study report that they always watch with other people, and 29 percent mostly watch with others (including those who watch mostly with other blind people), while 49 percent mostly watch alone, and 19 percent always watch television

²³ Specifically, the 1994-95 "disability supplement" to the Health Interview Survey, National Center for Health Statistics, and AFB's fall 1995 survey of a national sample of persons who self-screened into the study from a household panel omnibus survey.

²⁴ 1:14 Do you live alone or with other people?

alone.²⁵ Thus, even though most of the participants do live with other people, two-thirds watch television alone most or all of the time.

Since television is primarily a visual medium, it is not as accessible to blind individuals - whether they watch alone or not - as it is to sighted people. The overwhelming majority of study participants (93%) feel that, when they watch television, they miss information that is available to fully-sighted people (61% report missing information; 32% missing some information; 7% not missing information).²⁶ Thus, almost everyone in this study reported that they were not getting all the information fully-sighted individuals do from television viewing.

Our study participants report that, when they do watch television with other people, these people usually supply information that makes the programs more enjoyable and more informative.²⁷ As discussed above, only 19 percent of the participants always watch television alone; therefore, over three-quarters watch with others at least some of the time (81% -- comprised of 49% who mostly watch alone, 29% who mostly watch with others including those who mostly watch with other blind people, and 3% who always watch with others). Among those who report they watch with others, 80 percent report that someone describes what is happening at least some of the time. Virtually all these people say that these descriptions are important to helping them both understand and enjoy the programs (96% and 99% respectively).²⁸ Thus, these participants indicate quite strongly that informal description enhances their television viewing.

To summarize thus far, the study participants report that they do miss information that is available to fully-sighted people and that when someone provides descriptions they get more out of the programs. However, nearly two-thirds of the participants watch television alone most

²⁵ 4:18 How often do you watch television alone? Do you always watch alone, or mostly watch alone, or mostly watch with other people, or always watch with other people?

²⁶ 4:14 When you watch TV programs, do you feel you are missing information that is available to fully-sighted people? Would you say "yes," or "sometimes," or "no?"

²⁷ 4:18a (*For those who watch with other people at all:*) When you watch television with others, does someone describe what is happening to you? "Yes," or "sometimes," or "no?"

²⁸ 4:18b (*If someone does describe*) How important is their description to your understanding the content of the program: not important, or somewhat important, or very important?

4:18c How important is their description to your enjoying the program: not important, or somewhat important, or very important?

or all of the time. In addition, presumably some of the time when people are watching with others, no one is describing for them. This means that much of the time people with visual impairments do not get descriptions that would help them understand and enjoy television programs.

Informal description by others who are watching the programs clearly enhances TV viewing for almost all the study participants who experience it. On the positive side, this informal description may provide some social interaction; moreover, those explaining the program can tailor their commentary to their friend's or relative's interests. However, on the negative side, having to describe--or needing someone to describe--may be an unwelcome burden. Also, the commentary may be intrusive or may miss important points. Further, informal description is not always available even when others are watching the program. More importantly, as discussed above, much TV watching is solitary

Described Television Viewing

Audio description provides information about visual aspects of the program to those who want it. These descriptions, written by professional writers, are inserted during pauses in the program narration. Having audio description available frees viewers who cannot see everything from depending on someone to fill in accounts of crucial actions and significant details. Further, the description is available whether or not anyone else is watching the program.

In the experimental portion of this evaluation, the viewing sessions, each participant saw one television program presented with description and a different program presented without description. After watching each program, each participant was asked about his or her responses to the program; the questions did not direct the participant's attention to whether the program did or did not contain added description. Then, one to two months after the television viewing session, each participant was asked about his or her reaction to described television programs in general. The people who participated in this study regard audio description very positively overall. More detailed findings from these two parts of the evaluation are reported below--first the experimental findings, and then the more general assessments

Viewing Session

The participants were asked to rate each program on a series of ten-point scales; see Table 1.²⁹ Overall, the participants reported that they enjoyed each program. They judged

²⁹ 2:34, 3:34 For me, the show was uninformative -- For me, the show was informative
(Now rate your response from 1 to 10 where 1 is very uninformative and
10 is very informative)

2:35, 3:35 I found the program confusing -- I found the program clear (Where 1 is

both programs to be satisfying and enjoyable, informative, interesting, and clear.

Since half the participants saw each program with description, we can compare the ratings of the experimental and control groups, i.e., those who saw the program with and without description. However, in comparing the two groups, it is important to note that for each of these questions in the viewing session, 25-50 percent of the participants gave the highest possible rating; this creates a "ceiling effect" that makes it difficult to show differences between the two groups.

Table 1

Experimental and Control Participants' Mean Ratings of Features of the Two TV Science Programs

Variable	"Orphans of Time"			"Wild Dogs of Africa"		
	Means			Means		
	Experimental Group (with description)	Control Group (without description)	Total	Experimental Group (with description)	Control Group (without description)	Total
Satisfying	8.0	7.5	7.7	8.0	6.4	7.2
Enjoyable	8.2	8.1	8.1	7.9	7.4	7.7
Informative	8.1	7.6	7.8	7.9	7.0	7.5
Interesting	7.7	7.9	7.8	7.7	7.2	7.5
Clear	7.8	7.9	7.8	8.7	7.3	8.0

very confusing and 10 is very clear)

2:36, 3:36 During the programs I was bored -- During the program, I was interested
(Where 1 is very bored and 10 is very interested)

2:37, 3:37 I did not enjoy the program -- I did enjoy the program (Where 1 is I did
not enjoy it at all and 10 is I enjoyed it a great deal)

2:38, 3:38 For me, the show was frustrating -- For me, the show was satisfying
(Where 1 is very frustrating and 10 is very satisfying)

For the program "Orphans of Time," ratings by the experimental and control groups did not differ significantly on any of these variables. In contrast, for "Wild Dogs of Africa," the experimental group rated the program as significantly more satisfying, informative, and clear than did the control group (satisfying: $t=3.36$, $p<.001$; informative: $t=1.88$, $p=.03$; clear: $t=3.33$, $p<.001$).³⁰ The differences on the questions about whether the program was enjoyable and interesting are in the same direction, but do not reach statistical significance.

The significant differences found in "Wild Dogs of Africa" and not significant differences in "Orphans of Time" may reflect the styles of these two specific programs. As discussed above, "Wild Dogs of Africa," from the series *Nature*, has longer breaks in the narration than does "Orphans of Time," from the series *The New Explorers*. Therefore, one might expect the experience of the experimental and control groups to be more different for the viewing of "Wild Dogs of Africa" than for "Orphans of Time." This difference may have been magnified by the order effects; i.e. those who saw "Wild Dogs of Africa" without description had earlier seen "Orphans of Time" with description.

General Reactions

Another series of questions, administered one to two months after participants watched the two programs, asked them about their response to described television programs in general. When asked whether audio description is enjoyable, interesting, and informative, 85-95 percent consider that it is.³¹ When asked whether audio description is confusing or boring, 78 percent and 87 percent, respectively, judge that it is not. When asked whether description repeats information they could have figured out for themselves, 63 percent report that it does not, while 32 percent say that it does.³² Therefore, looking at these six questions together, the

³⁰ In this analysis and the ones that follow, we are testing the hypothesis that the experimental group will answer questions in a more positive direction and will answer more factual questions correctly than will the control group. Therefore, we report one-tail probabilities in all cases, using the conventional level of probability less than or equal to .05 to define statistical significance

³¹ 4:24 People respond to added description in different ways. For you, in general, is (would) the additional description (be) enjoyable? Would you say "yes," "no," or "it makes no difference?" Is it
confusing?
interesting?
boring?
informative?
repeating what you can figure out for yourself?

³² The DVS staff have given considerable thought to the possibility that some description may be redundant for viewers with some usable vision. While DVS writers try to keep all levels of visual impairment in mind, they write for the totally blind person first since

participants say that audio description generally is interesting, informative, and enjoyable; it is neither confusing nor boring, but some description repeats information some people could have figured out.

Since the participants in this study expressed such a positive evaluation of description in response to these questions, one might expect that they would have responded substantially more positively to the program they saw under the experimental condition and substantially more negatively to the program they saw under the control condition. In addition to the ceiling effect and the different opportunities for description in the two programs discussed above, another factor may account for the observed results. While the two sets of questions did ask about the same dimensions (enjoyment, interest, clarity, etc.), they were not identical. The questions in the viewing session asked about the specific program the participants had just watched; all the features of the program entered into the participants' ratings since their attention was not drawn specifically to the presence or absence of audio description. In contrast, the questions asked several weeks later explicitly focussed the participants on the differences, if any, that description makes on television programs in general, not the two specific programs used in this research. Therefore, in answering these questions, participants were being asked to draw on all the experience they have had with description, not just the programs used in this study. (We plan to explore this in the future by examining whether participants who had more experience with description answered differently from those who had less or no experience.)

SOCIAL CONSEQUENCES OF DESCRIPTION

Television is an important medium by which people gain access to information and share the popular culture. In this section we examine whether having television programs described affects how comfortable people with visual impairments are talking about the programs with sighted people.

Viewing Session

After each program in the viewing sessions, each participant was asked how comfortable s/he would be talking about that program with sighted friends.³³ (See Table 2.) For each

technical reasons allow only one described narration to be added. According to DVS staff members, the DVS Consumer Advisory Council discussions indicate that those with some vision are sympathetic to the describers' challenges and to the needs of totally blind viewers.

- ³³ 2:40, 3:40 How comfortable would you feel discussing this show with sighted friends who had also seen it? Would you be very comfortable, somewhat comfortable, somewhat uncomfortable, or very uncomfortable?

Coding: 1 = Very comfortable

program, slightly more than half the participants said they would be very comfortable discussing it (56% for "Orphans of Time;" 53% for "Wild Dogs of Africa"). However, while only 9 percent of the participants said they would be somewhat or very uncomfortable discussing "Orphans of Time," 21 percent said they would be uncomfortable discussing "Wild Dogs of Africa." The responses of the experimental and control groups do not differ with regard to "Orphans of Time" (experimental and control means=1.6; $t=0.04$; $p=NS$). However, the groups do differ regarding "Wild Dogs of Africa:" those who saw the described version are significantly more comfortable discussing the program with sighted friends. Note that the coding on this question means that lower scores indicate more comfort discussing the program: experimental mean=1.5, control mean=2.0; $t=3.09$, $p < .002$.

Table 2

Experimental and Control Participants' Mean Ratings: Talking About Two TV Science Programs with Sighted Friends

	Experimental Group (with description) Mean	Control Group (without description) Mean	t-test	Probability (one-tailed)
"Orphans of Time"				
Comfortable Talking*	1.6	1.6	0.04	NS
Number of Aspects Difficult to Discuss**	2.9	2.9	0.02	NS
"Wild Dogs of Africa"				
Comfortable Talking*	1.5	2.0	3.09	< .002
Number of Aspects Difficult to Discuss**	3.3	2.6	4.32	< .001

* Coding: 1=Very comfortable discussing program with sighted friends.

4=Very uncomfortable discussing program with sighted friends.

** Coding: 1=There were a lot of aspects I would have difficulty discussing.

4=There were no aspects I would have difficulty discussing.

After participants were asked how comfortable they would be talking about the program with sighted friends, they were asked how many aspects of the program would be difficult for

2=Somewhat comfortable

3=Somewhat uncomfortable

4=Very uncomfortable

them to discuss with sighted people.³⁴ For "Orphans of Time," the experimental and control groups had almost identical means (2.87 and 2.86, respectively; $t=0.02$, $p=NS$). However, the difference between the experimental and control group means regarding "Wild Dogs of Africa" is highly significant: those who saw the described version reported significantly fewer aspects that they would have difficulty discussing. Note that the coding on this question means that lower scores indicate more difficulty discussing the program: 1=There were a lot of aspects I would have difficulty discussing; 4=There were no aspects I would have difficulty discussing; experimental mean=3.31, control mean=2.57, respectively; $t=4.32$, $p<.001$.

As discussed above, the differences in participants' level of comfort talking about the two programs seem to reflect the differences between the styles of the two programs when they are presented without description (similar to the differences when the participants were asked to rate how satisfactory, informative, clear, etc. the programs are, as discussed above).

General Reactions

Separately from the questions about the specific programs, each participant was asked explicitly whether having television programs described makes him or her more comfortable talking about the program with sighted people.³⁵ About three-quarters of the participants (73 percent) said that description makes them considerably or a lot more comfortable talking with sighted people. In follow-up questions, 66 percent said having programs described makes a big difference in their ability to talk about the program, and 50 percent said it makes a big difference in the questions they ask; only 11 percent and 7 percent, respectively, said it makes no difference.³⁶ An open-ended follow-up asked those who had said having a program

³⁴ 2:41, 3:41 How many aspects of the program would you have difficulty discussing, if any?
 Coding 1=There were a lot of aspects I would have difficulty discussing.
 2=There were quite a few aspects I would have difficulty discussing.
 3=There were a small number of aspects I would have difficulty discussing.
 4=There were no aspects I would have difficulty discussing.

³⁵ 4:30 Now think about how comfortable you are talking with sighted people about TV programs. To you, does seeing programs with added description make you no more comfortable, or a little more comfortable, or considerably more comfortable, or a lot more comfortable?

³⁶ 4:31 Does having a program described make a difference in how much you, yourself, are able to talk about the program afterwards? Does it make no difference, or some difference, or a big difference?

4:32 Does having a program described make a difference in the questions you ask

described made a difference whether there were other ways it made a difference.³⁷ Most of those who responded emphasized that description helped them understand the programs better or that having programs described gave them more confidence, for example:

[I'm] able to understand what's going on--able to share. [I] need more help without description.

I would like to be able to go into more detail about things and get a better understanding of all aspects.

If I'm unsure of events in the program, I feel awkward trying to pretend I do.

In addition, some participants pointed to specific aspects of programs or particular social settings in which description especially mattered to them:

It would make a big difference regarding charts and graphs; also to discuss some actions.

I might misconstrue. I usually hold back about talking about action scenes because I might be wrong.

With my children, a lot more. I mostly talk with my children and description makes me a lot more comfortable.

Participants' Preferences Regarding Description

When participants were asked whether, if they have a choice, they prefer to watch programs with or without added description, the overwhelming majority (79%) said they preferred to watch described programs, while only 5 percent said they preferred to watch without description.³⁸ A pair of questions asked about the amount of description the person would prefer for television programs in general and for television science programs in particular; only 2 percent and 4 percent, respectively, prefer no added description.³⁹ Finally, another pair

others about the program? Does it make no difference, or some difference, or a big difference?

³⁷ 4:33 Are there (other) ways having a program described affects how comfortable you are talking about the program with sighted people?

³⁸ 4:34 If you had a choice, would you prefer to watch programs with added description, or without added description, or does it make no difference?

³⁹ 4:25 Thinking of TV programs in general, do (would) you prefer to have programs with no added description, or a little added description, or some added description, or a lot of added description?